

Expansion of Discovery of Sound in the Sea (DOSITS) Content and Outreach FY11-FY12

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<http://www.dosits.org>

LONG-TERM GOALS

The long-term goal of this effort is to educate the public on the basic science of sound in the sea, how people and animals use underwater sound to accomplish many of the tasks for which we use light in air, and how sound in the ocean affects marine life. The products of this effort include an interactive on-line resource, a CD-ROM, and printed materials.

OBJECTIVES

The objective of this effort is to develop and maintain resources that address the long-term goal. The resources include a website (Figure 1), an educational CD-ROM, a tri-fold educational pamphlet, and an informational 16-page booklet.

APPROACH

Efforts have focused on enhancing and expanding the scientific content of the *Discovery of Sound in the Sea* website that was launched in November 2002. During the past ten years, Marine Acoustics, Inc. (MAI) and the University of Rhode Island's (URI) Graduate School of Oceanography (GSO) have developed a successful working relationship to create the website, an educational CD-ROM, and associated printed materials. These resources undergo regular updates and rigorous scientific review by a panel of scientists in the field, led by Drs. Peter Worcester (Scripps Institution of Oceanography), Jim Miller (University of Rhode Island), and Darlene Ketten (Harvard University Medical School and Woods Hole Oceanographic Institution). MAI and GSO make all final decisions on the site content.

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Figure 1: Interactive front page of “Discovery of Sound in the Sea” website (<http://www.dosits.org>)

WORK COMPLETED

During the tenth year of research, MAI focused on several tasks to enhance and expand the website that was launched in November 2002, and to reach additional audiences that have not been targeted in the past. These tasks included the following:

1. Redesign of the *Discovery of Sound in the Sea* website
 - Enhancement of copyright feature: contacted data providers of sound files to DOSITS to complete a copyright authorization form and determine whether their sound files could be made available under Creative Commons Licensing
 - Addition of scientific names to DOSITS: added scientific names to DOSITS within the structure available through the website’s content management system
 - Reworked navigation issue: Decreased the length and number of subtitles within DOSITS
2. Maintain and develop the *Discovery of Sound in the Sea* website
 - Organized and led discussion to revise older pages of the DOSITS website at upcoming review meetings
 - Reviewed two updated sections on the potential effects of underwater sound on fish hearing: Animals > Fish > Effects > Hearing loss and Animals > Fish > Effects > Physiological stress
 - Discussions with URI regarding spectrogram structure and content in updated Audio Gallery

- Prioritized tasking and led Spring 2012 Review Meeting
 - Worked with URI personnel to add Feature Teachers extension to the website
 - Reviewed recently published literature on effects of underwater sound on marine life to include the best-available information on the DOSITS website
 - Revised Animals > Effects > Masking section with recently published literature
 - Revisions to Animals > Hearing > Hearing in Pinnipeds
 - Working with Dr. Brandon Southall and recent results at UCSC Long Marine Lab; work has not been published yet. Coordinating with Dr. Darlene Ketten for ear images and working to update and expand section with published literature that are available.
 - Edits to Advanced Topic > Introduction to Decibels and Science > Sound in Air vs Water to make compatible with ANSI Standards
 - Created definitions for "source level" and "received level", in addition to reviewing references to "sound pressure level" and "intensity" with regard to ANSI Standards
 - Edits to Facts and Myths page in response to comments from the Advisory Panel at the November 2011 Review Meeting
 - Reviewed Icebergs Colliding content for the Audio Gallery
3. Adding new topics to the *Discovery of Sound in the Sea* website
- Prepared new content on Animals > Advanced Topic > What components of sound do animals hear? for review at Fall 2011 Review Meeting
 - Prepared new content on Animals > Advanced Topic > How did odontocete hearing evolve? for review at Spring 2012 Review Meeting
 - Received movie files from Dr. Darlene Ketten (WHOI), email exchange on the details that the movie demonstrates
 - Obtained reprints of recent literature on cetacean hearing evolution from URI libraries
 - Reviewing material in appropriate textbooks
 - Coordinated with colleagues on translation of DOSITS informational booklet to Spanish
 - Outlined Needs Assessment for informal educators and undergraduate educators
 - Outlined Career Gallery that will be developed in FY13
 - Outlined DOSITS iBook that will be created at a future time
4. Outreach with outside organizations interested in communicating underwater sound topics
- Correspondence with Dr. Whitlow Au and Dr. Paul Nachtigall to determine availability for a speaker at the DOSITS IEEE/MTS workshop in Hawai'i
 - Prepared and presented talk at the Southeast New England Marine Educators (SENEME) conference, Project Oceanology, Groton, CT, Sat 15 Oct 2011

- Working on request from Yeosu Expo (2012 World's Fair in South Korea): request to use DOSITS images
- Prepared and presented talk at the Education and Conservation Workshop at the 19th Biennial Conference on the Biology of Marine Mammals
- Travel to and participate in the 19th Biennial Conference on the Biology of Marine Mammals, 25 Nov – 3 Dec 2011, Tampa, FL
- Reviewed Acoustical Society of America teacher resources for possible links on DOSITS
- Reviewed sonoluminescence article by the BBC for possible link on DOSITS
- Reviewed digital textbook information on Duke's Cachalot project
- Worked with URI on presentation for National Science Teachers Association Meeting
- Reviewed and revised draft abstracts for the National Marine Educators Association conference
- Worked with URI on abstract for DOSITS half-day workshop at the 2013 National Science Teachers Association Meeting
- Worked with URI on presentation and travel details for the National Marine Educators Association Meeting, 24-28 June 2012 in Anchorage, AK
- Worked with URI on preparing and printing the DOSITS poster for the ONR Marine Mammal and Biology Program Review Meeting, 16-18 Apr 2012 in Arlington, VA
- Travel to and participate in the ONR Marine Mammal and Biology Program Review Meeting, 16-18 Apr 2012 in Arlington, VA
- Discussions with URI colleagues re: Ocean Conservation Research (Michael Stocker)'s inappropriate/illegal use of DOSITS material
- Planning for October Acoustical Society of America gala (10-yr anniversary of DOSITS online)

5. Review of the *Discovery of Sound in the Sea* Scientific Content

- Helped incorporate final edits from the Advisory Panel for the 12-page educational booklet
- Planning for November 2011 Advisory Panel Review Meeting: draft agenda, participant list; revise agenda; help with logistics of hosting researchers
- Led fall review meeting at URI, 16-18 Nov 2011
- Worked with URI on planning and logistics for Spring 2012 Review Meeting (5-7 Jun 2012 at URI)
- Prepared draft one-page abstract for ONR Marine Mammal and Biology Program Review Meeting; submitted to ONR by 23 March 2012 deadline
- Discussions with URI colleagues regarding June 2012 Program Review Meeting: agenda, tasks to be completed prior to meeting, priorities for review meeting
- Led spring Advisory Panel Review Meeting, June 5-7, 2012 at URI

RESULTS

The “Discovery of Sound in the Sea” website has received an overwhelming response. It was first launched in November 2002. Through September 2012, DOSITS has had more than 54 million hits (Figure 2). In March 2010, a new site design was launched. The new design, along with a promotional push, saw the site traffic grow substantially. From January 2012 to September 25, 2012, DOSITS has had 6.7 million hits, 455,000 page views, and served 120GB of data.

IMPACT/APPLICATIONS

The “Discovery of Sound in the Sea” website and printed publications are resources for educating and exposing the public to the basic science of sound in the sea and how it is used to communicate, navigate, and explore the oceans. By providing information in multiple formats, teachers can bring this content into their classrooms; public affairs personnel can inform themselves of controversial issues and provide materials to Congress; and the public can begin to include science in their decisions. DOSITS is recognized as a resource by established journal outlets, as evidenced by our involvement in the January 2011 issue of National Geographic “The Big Idea” section (<http://ngm.nationalgeographic.com/2011/01/big-idea/noisy-ocean>).

TRANSITIONS

DOSITS is recognized as the world leader in education and outreach on underwater acoustics. With the appropriate permissions, the National Oceanic and Atmospheric Administration has incorporated components of the DOSITS Audio Gallery into its exhibit “Sounds of the Sea” for the Smithsonian Institution’s National Museum of Natural History Ocean Hall “Oceans Today” kiosks. These kiosks are located at the entrance to the Ocean Hall, thereby making it one of the first components that visitors to this newly constructed exhibit will encounter. This prominent placement ensures a very broad impact from the work of the DOSITS team.

RELATED PROJECTS

University of Rhode Island (URI) *Discovery of Sound in the Sea* Award Number: N00014-12-10252. Dr. Kathleen Vigness-Raposa from Marine Acoustics Inc. is the co-Principal Investigator on the *Discovery of Sound in the Sea* project with Gail Scowcroft from URI. Dr. Vigness-Raposa provides technical guidance for URI personnel on additional science content and educational materials for the *Discovery of Sound in the Sea* project.

PUBLICATIONS

“Discovery of Sound in the Sea” website

“Discovery of Sound in the Sea” CD-ROM

Scowcroft, G., Vigness Raposa, K., Knowlton, C., and Morin, H. 2011. *Discovery of Sound in the Sea*. University of Rhode Island. (16-page information booklet)

Scowcroft, G., Vigness Raposa, K., Knowlton, C., and Morin, H. 2010. *Discovery of Sound in the Sea*. University of Rhode Island. (tri-fold pamphlet)

Vigness-Raposa, K.J., Scowcroft, G., Miller, J.H., and Ketten, D.R. 2012. Discovery of Sound in the Sea: An on-line resource. *In: The Effects of Noise on Aquatic Life* (Arthur N. Popper and Anthony Hawkins, eds.). Springer, New York.

Vigness-Raposa, K.J., Scowcroft, G., Knowlton, C., and Worcester, P.F. 2008. Discovery of Sound in the Sea Website: An educational resource. *Bioacoustics* 17: 348-350.

HONORS/AWARDS/PRIZES

2007 Acoustical Society of America Science Writing Award for Media other than an Article

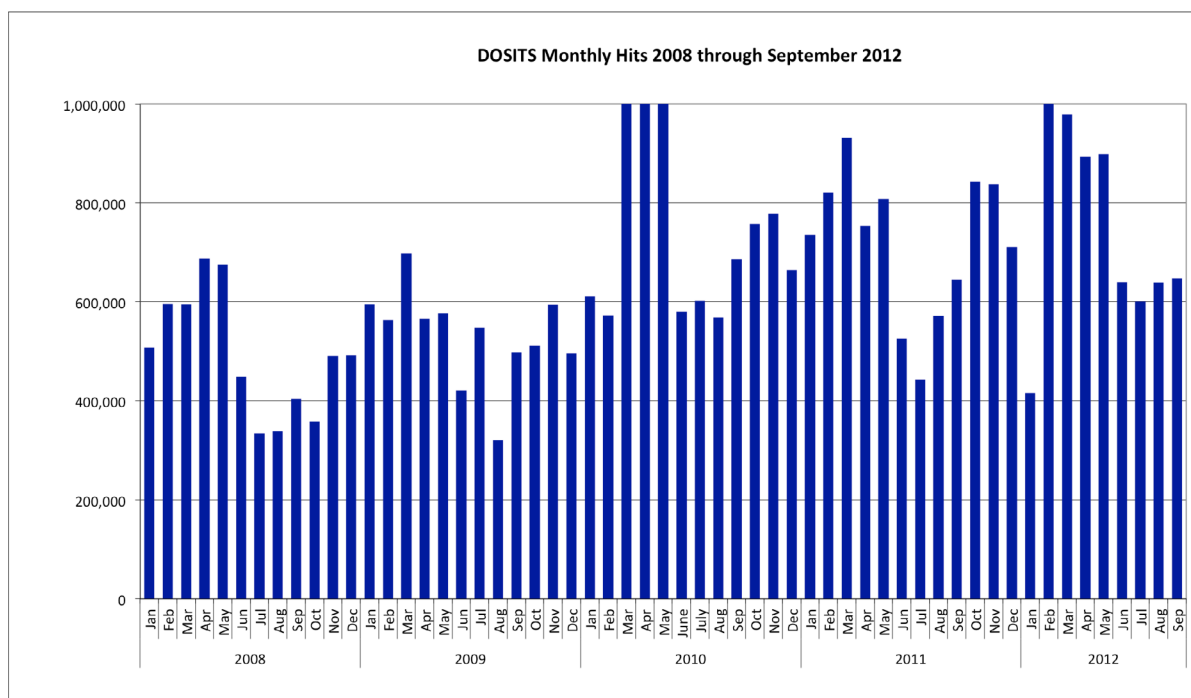


Figure 2: The “Discovery of Sound in the Sea” website (<http://www.dosits.org>) has received over 54 million hits since it was first launched in November 2002.